CLAIMS

1. A method for forming a semiconductor structure, the method comprising:
forming a strained semiconductor layer over a substrate; and
depositing a screening layer over at least a portion of a top surface of the strained semiconductor layer.

2. The method of claim 1 wherein the substrate comprises at least one of silicon and germanium.

3. The method of claim 1 wherein the strained semiconductor layer is tensilely strained.

4. The method of claim 3 wherein the strained semiconductor layer comprises tensilely strained silicon or tensilely strained silicon-germanium alloy.

5. The method of claim 1 wherein the strained semiconductor layer is compressively strained.

6. The method of claim 5 wherein the strained semiconductor layer comprises compressively strained germanium or compressively strained silicon-germanium alloy.

7. The method of claim 1 wherein the strained layer has a thickness ranging from about 50 Å to about 1000 Å.

8. The method of claim 7 wherein the thickness of the strained layer does not exceed about 300 Å.

9. The method of claim 8 wherein the thickness of the strained layer does not exceed about 200 Å.

10. The method of claim 7 wherein the thickness of the strained semiconductor is substantially unchanged following the deposition of the screening layer.

11. The method of claim 1 wherein the substrate comprises an insulating layer disposed underneath the strained semiconductor layer.

12. The method of claim 1 wherein the substrate comprises a relaxed semiconductor layer disposed underneath the strained semiconductor layer.

13. The method of claim 12 wherein the substrate further comprises a compositionally graded layer disposed underneath the relaxed semiconductor layer.

14. The method of claim 13 wherein the graded layer comprises at least one of a group II, a group III, a group IV, a group V, and a group VI element.

15. The method of claim 14 wherein the graded layer comprises at least one of silicon and germanium.

16. The method of claim 15 wherein the graded layer is graded to a concentration of greater than about 10% germanium.

17. The method of claim 13 wherein the thickness of the graded layer ranges from about 0.5 μm to about 10.0 μm.

18. The method of claim 1 wherein the step of depositing the screening layer comprises chemical vapor deposition.

19. The method of claim 1 wherein the screening layer comprises an oxide layer.

20. The method of claim 19 wherein the screening layer is selected from the group consisting of: silicon dioxide, silicon oxynitride, silicon germanium oxide, and germanium oxide.

21. The method of claim 1 wherein the screening layer has a thickness ranging from about 20 Å to about 300 Å.

22. The method of claim 1, further comprising:
introducing dopants into the semiconductor structure, wherein the screening layer affects the introduction of dopants into at least a portion of the structure by at least one of scattering dopants and reducing energy of the dopants.

23. The method of claim 22, further comprising:

subjecting the structure to a thermal anneal, wherein the screening layer hinders out-diffusion of the dopants from at least a portion of the substrate.

24. The method of claim 1, further comprising, prior to depositing a screening layer, growing an oxide layer over the portion of the top surface of the strained semiconductor layer.

25. The method of claim 24 wherein the oxide layer is grown by a rapid thermal oxidation.

26. The method of claim 25 wherein the thickness of the oxide layer ranges from about 5 Å to about 30 Å.

27. A method for forming a structure, the method comprising:

forming a strained semiconductor layer over a substrate;

depositing a pad oxide layer over at least a portion of a top surface of the strained semiconductor layer; and

forming a masking layer over the pad oxide layer; the pad oxide layer substantially inhibiting formation of stress-induced defects in the strained semiconductor layer.

28. The method of claim 27 wherein the masking layer comprises silicon nitride.

29. The method of claim 27, further comprising, prior to depositing a pad oxide layer, growing an oxide layer over the portion of the top surface of the strained semiconductor layer.

29. The method of claim 29 wherein the oxide layer is grown by a rapid thermal oxidation.

30. The method of claim 29 wherein the thickness of the oxide layer ranges from about 5 Å to about 30 Å.

31. The method of claim 27 wherein the substrate comprises at least one of silicon and germanium.

32. The method of claim 27 wherein the strained semiconductor layer is tensilely strained.

34. The method of claim 33 wherein the strained semiconductor layer comprises tensilely strained silicon or tensilely strained silicon-germanium alloy.

35. The method of claim 27 wherein the strained semiconductor layer is compressively strained.

36. The method of claim 35 wherein the strained semiconductor layer comprises compressively strained germanium or compressively strained silicon-germanium alloy.

37. The method of claim 27 wherein the strained layer has a thickness ranging from about 50 Å to about 1000 Å.

38. The method of claim 37 wherein the thickness of the strained layer does not exceed about 300 Å.

39. The method of claim 38 wherein the thickness of the strained layer does not exceed about 200 Å.

40. The method of claim 37 wherein the thickness of the strained semiconductor is substantially unchanged following the deposition of the pad oxide layer.

41. The method of claim 27 wherein the substrate comprises an insulating layer disposed underneath the strained semiconductor layer.

42. The method of claim 27 wherein the substrate comprises a relaxed semiconductor layer disposed underneath the strained semiconductor layer.

43. The method of claim 42 wherein the substrate further comprises a compositionally graded layer disposed underneath the relaxed semiconductor layer.

44. The method of claim 43 wherein the graded layer comprises at least one of a group II, a group III, a group IV, a group V, and a group VI element.

45. The method of claim 44 wherein the graded layer comprises at least one of silicon and germanium.

46. The method of claim 45 wherein the graded layer is graded to a concentration of greater than about 10% germanium.

47. The method of claim 43 wherein the thickness of the graded layer ranges from about 0.5 μm to about 10.0 μm.

48. The method of claim 27 wherein the step of depositing the pad oxide layer comprises chemical vapor deposition.

49. The method of claim 27 wherein the pad oxide layer is selected from the group consisting of: silicon dioxide, silicon oxynitride, silicon germanium oxide, and germanium oxide.

50. The method of claim 27 wherein the pad oxide layer has a thickness ranging from about 50 Å to about 500 Å.